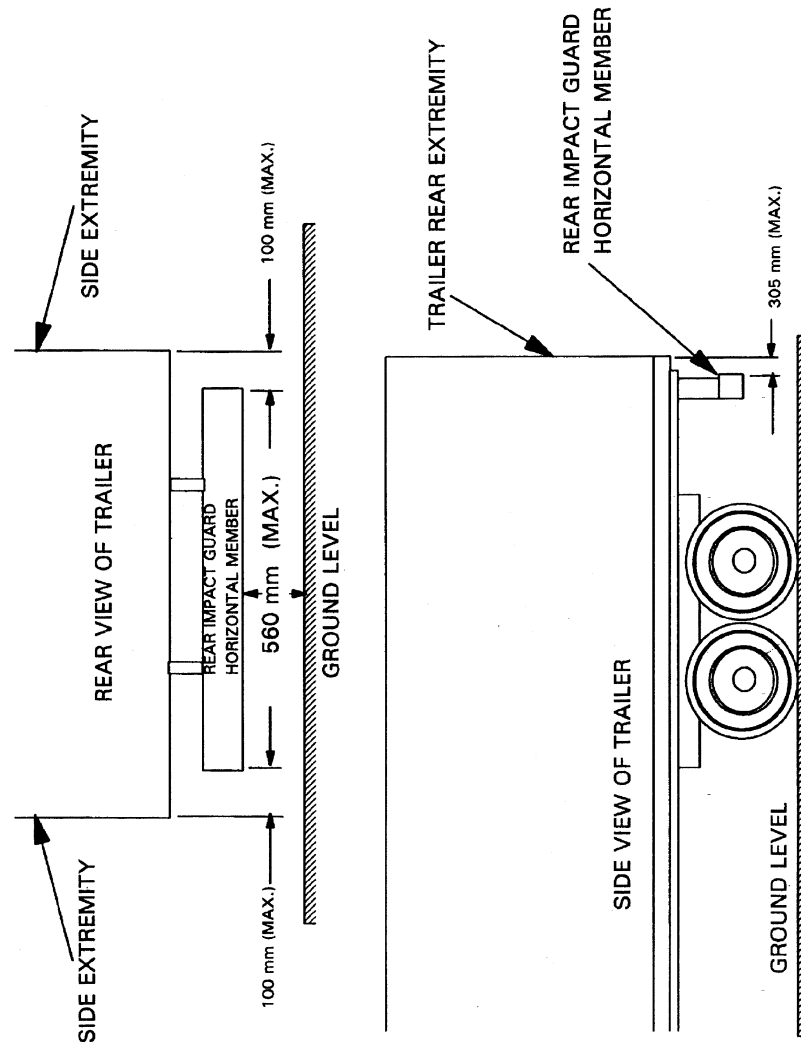


FIGURE 1. CONFIGURATION REQUIREMENTS



[61 FR 2035, Jan. 24, 1996, as amended at 63 FR 3662, Jan. 26, 1998]

§ 571.301 Standard No. 301; Fuel system integrity.

S1. *Scope.* This standard specifies requirements for the integrity of motor vehicle fuel systems.

S2. *Purpose.* The purpose of this standard is to reduce deaths and injuries occurring from fires that result from fuel spillage during and after

motor vehicle crashes, and resulting from ingestion of fuels during siphoning.

S3. *Application.* This standard applies to passenger cars, and to multipurpose passenger vehicles, trucks and buses that have a GVWR of 4,536 kg or less and use fuel with a boiling point above 0° C, and to school buses that have a GVWR greater than 4,536 kg and use fuel with a boiling point above 0° C.

S4. *Definition. Fuel spillage* means the fall, flow, or run of fuel from the vehicle but does not include wetness resulting from capillary action.

S5. *General requirements.*

S5.1 *Passenger cars, and multipurpose passenger vehicles, trucks, and buses with a GVWR of 10,000 pounds or less.* Each passenger car and each multipurpose passenger vehicle, truck, and bus with a GVWR of 10,000 pounds or less shall meet the requirements of S6.1 through S6.4. Each of these types of vehicles that is manufactured to use alcohol fuels shall also meet the requirements of S6.6.

S5.2 [Reserved]

S5.3 [Reserved]

S5.4 *Schoolbuses with a GVWR greater than 10,000 pounds.* Each schoolbus with a GVWR greater than 10,000 pounds shall meet the requirements of S6.5. Each schoolbus with a GVWR greater than 10,000 pounds that is manufactured to use alcohol fuels shall meet the requirements of S6.6.

S5.5 *Fuel spillage; Barrier crash.* Fuel spillage in any fixed or moving barrier crash test shall not exceed 28 g from impact until motion of the vehicle has ceased, and shall not exceed a total of 142 g in the 5-minute period following cessation of motion. For the subsequent 25-minute period, fuel spillage during any 1 minute interval shall not exceed 28 g.

S5.6 *Fuel spillage; rollover.* Fuel spillage in any rollover test, from the onset of rotational motion, shall not exceed a total of 142 g for the first 5 minutes of testing at each successive 90° increment. For the remaining test period, at each increment of 90° fuel spillage during any 1 minute interval shall not exceed 28 g.

S5.7. *Alcohol fuel vehicles.* Each vehicle manufactured to operate on an alcohol fuel (e.g., methanol, ethanol) or a fuel blend containing at least 20 percent alcohol fuel shall meet the requirements of S6.6.

S6. *Test requirements.* Each vehicle with a GVWR of 4,536 kg or less shall be capable of meeting the requirements of any applicable barrier crash test followed by a static rollover, without alteration of the vehicle during the test sequence. A particular vehicle need not meet further requirements after having

been subjected to a single barrier crash test and a static rollover test.

S6.1 *Frontal barrier crash.* When the vehicle travelling longitudinally forward at any speed up to and including 48 km/h impacts a fixed collision barrier that is perpendicular to the line of travel of the vehicle, or at any angle up to 30° in either direction from the perpendicular to the line of travel of the vehicle, with 50th-percentile test dummies as specified in part 572 of this chapter at each front outboard designated seating position and at any other position whose protection system is required to be tested by a dummy under the provisions of Standard No. 208, under the applicable conditions of S7., fuel spillage shall not exceed the limits of S5.5.

S6.2 *Rear moving barrier crash.* When the vehicle is impacted from the rear by a barrier moving at 48 km/h, with test dummies as specified in part 572 of this chapter at each front outboard designated seating position, under the applicable conditions of S7., fuel spillage shall not exceed the limits of S5.5.

S6.3 *Lateral moving barrier crash.* When the vehicle is impacted laterally on either side by a barrier moving at 32 km/h with 50th-percentile test dummies as specified in part 572 of this chapter at positions required for testing to Standard No. 208, under the applicable conditions of S7., fuel spillage shall not exceed the limits of S5.5.

S6.4 *Static rollover.* When the vehicle is rotated on its longitudinal axis to each successive increment of 90°, following an impact crash of S6.1, S6.2, or S6.3, fuel spillage shall not exceed the limits of S5.6.

S6.5 *Moving contoured barrier crash.* When the moving contoured barrier assembly traveling longitudinally forward at any speed up to and including 48 km/h impacts the test vehicle (school bus with a GVWR exceeding 4,536 kg) at any point and angle, under the applicable conditions of S7.1 and S7.5, fuel spillage shall not exceed the limits of S5.5.

S6.6 *Anti-siphoning test for alcohol fuel vehicles.* Each vehicle shall have means that prevent any hose made of vinyl plastic or rubber, with a length of not less than 1200 millimeters (mm) and an outside diameter of not less

than 5.2 mm, from contacting the level surface of the liquid fuel in the vehicle's fuel tank or fuel system, when the hose is inserted into the filler neck attached to the fuel tank with the fuel tank filled to any level from 90 to 95 percent of capacity.

S7. Test conditions. The requirements of S5.1 through S5.6 and S6.1 through S6.5 shall be met under the following conditions. Where a range is specified, the vehicle must be capable of meeting the requirements at all points within the range.

S7.1 General test conditions. The following conditions apply to all tests.

S7.1.1 The fuel tank is filled to any level from 90 to 95 percent of capacity with Stoddard solvent, having the physical and chemical properties of type 1 solvent, Table I ASTM Standard D484-71, "Standard Specifications for Hydrocarbon Dry Cleaning Solvents."

S7.1.2 The fuel system other than the fuel tank is filled with Stoddard solvent to its normal operating level.

S7.1.3 In meeting the requirements of S6.1 through S6.3, if the vehicle has an electrically driven fuel pump that normally runs when the vehicle's electrical system is activated, it is operating at the time of the barrier crash.

S7.1.4 The parking brake is disengaged and the transmission is in neutral, except that in meeting the requirements of S6.5 the parking brake is set.

S7.1.5 Tires are inflated to manufacturer's specifications.

S7.1.6 The vehicle, including test devices and instrumentation, is loaded as follows:

(a) Except as specified in S7.1.1, a passenger car is loaded to its unloaded vehicle weight plus its rated cargo and luggage capacity weight, secured in the luggage area, plus the necessary test dummies as specified in S6., restrained only by means that are installed in the vehicle for protection at its seating position.

(b) Except as specified in S7.1.1, a multipurpose passenger vehicle, truck, or bus with a GVWR of 4,536 kg or less is loaded to its unloaded vehicle weight, plus the necessary test dummies, as specified in S6., plus 136 kg or its rated cargo and luggage capacity weight, whichever is less, secured to

the vehicle and distributed so that the weight on each axle as measured at the tire-ground interface is proportional to its GAWR. If the weight on any axle, when the vehicle is loaded to unloaded vehicle weight plus dummy weight, exceeds the axle's proportional share of the test weight, the remaining weight shall be placed so that the weight on that axle remains the same. Each dummy shall be restrained only by means that are installed in the vehicle for protection at its seating position.

(c) Except as specified in S7.1.1, a school bus with a GVWR greater than 4,536 kg is loaded to its unloaded vehicle weight, plus 54 kg of unsecured mass at each designated seating position.

S7.2 Lateral moving barrier crash test conditions. The lateral moving barrier crash test conditions are those specified in S8.2 of Standard No. 208, 49 CFR 571.208.

S7.3 Rear moving barrier test conditions. The rear moving barrier test conditions are those specified in S8.2 of Standard No. 208, 49 CFR 571.208, except for the positioning of the barrier and the vehicle. The barrier and test vehicle are positioned so that at impact—

(a) The vehicle is at rest in its normal attitude;

(b) The barrier is traveling at 48 km/h with its face perpendicular to the longitudinal centerline of the vehicle; and

(c) A vertical plane through the geometric center of the barrier impact surface and perpendicular to that surface coincides with the longitudinal centerline of the vehicle.

S7.4 Static rollover test conditions. The vehicle is rotated about its longitudinal axis, with the axis kept horizontal, to each successive increment of 90°, 180°, and 270° at a uniform rate, with 90° of rotation taking place in any time interval from 1 to 3 minutes. After reaching each 90° increment the vehicle is held in that position for 5 minutes.

S7.5 Moving contoured barrier test conditions. The following conditions apply to the moving contoured barrier crash test.

S7.5.1 The moving barrier, which is mounted on a carriage as specified in

Figure 1, is of rigid construction, symmetrical about a vertical longitudinal plane. The contoured impact surface, which is 629 mm high and 1,981 mm wide, conforms to the dimensions shown in Figure 2, and is attached to the carriage as shown in that figure. The ground clearance to the lower edge of the impact surface is 133 mm \pm 13 mm. The wheelbase is 3,048 mm \pm 50 mm.

S7.5.2 The moving contoured barrier, including the impact surface, supporting structure, and carriage, has a mass of 1,814 kg \pm 23 kg with the mass distributed so that 408 kg \pm 11 kg is at each rear wheel and 499 kg \pm 11 kg is at each front wheel. The center of gravity is located 1,372 mm \pm 38 mm rearward of the front wheel axis, in the vertical longitudinal plane of symmetry, 401 mm above the ground. The moment of inertia about the center of gravity is:

$$I_x = 367 \text{ kgm}^2 \pm 18.4 \text{ kgm}^2$$

$$I_z = 4,711 \text{ kgm}^2 \pm 236 \text{ kgm}^2$$

S7.5.3 The moving contoured barrier has a solid nonsteerable front axle and fixed rear axle attached directly to the frame rails with no spring or other type of suspension system on any wheel. (The moving barrier assembly is equipped with a braking device capable of stopping its motion.)

S7.5.4 The moving barrier assembly is equipped with G78-15 pneumatic tires with a tread width of 152 mm \pm 25 mm, inflated to 165 kPa.

S7.5.5 The concrete surface upon which the vehicle is tested is level, rigid, and of uniform construction, with a skid number of 75 when measured in accordance with American Society of Testing and Materials Method E: 274-65T at 64 km/h, omitting water delivery as specified in paragraph 7.1 of that method.

S7.5.6 The barrier assembly is released from the guidance mechanism immediately prior to impact with the vehicle.

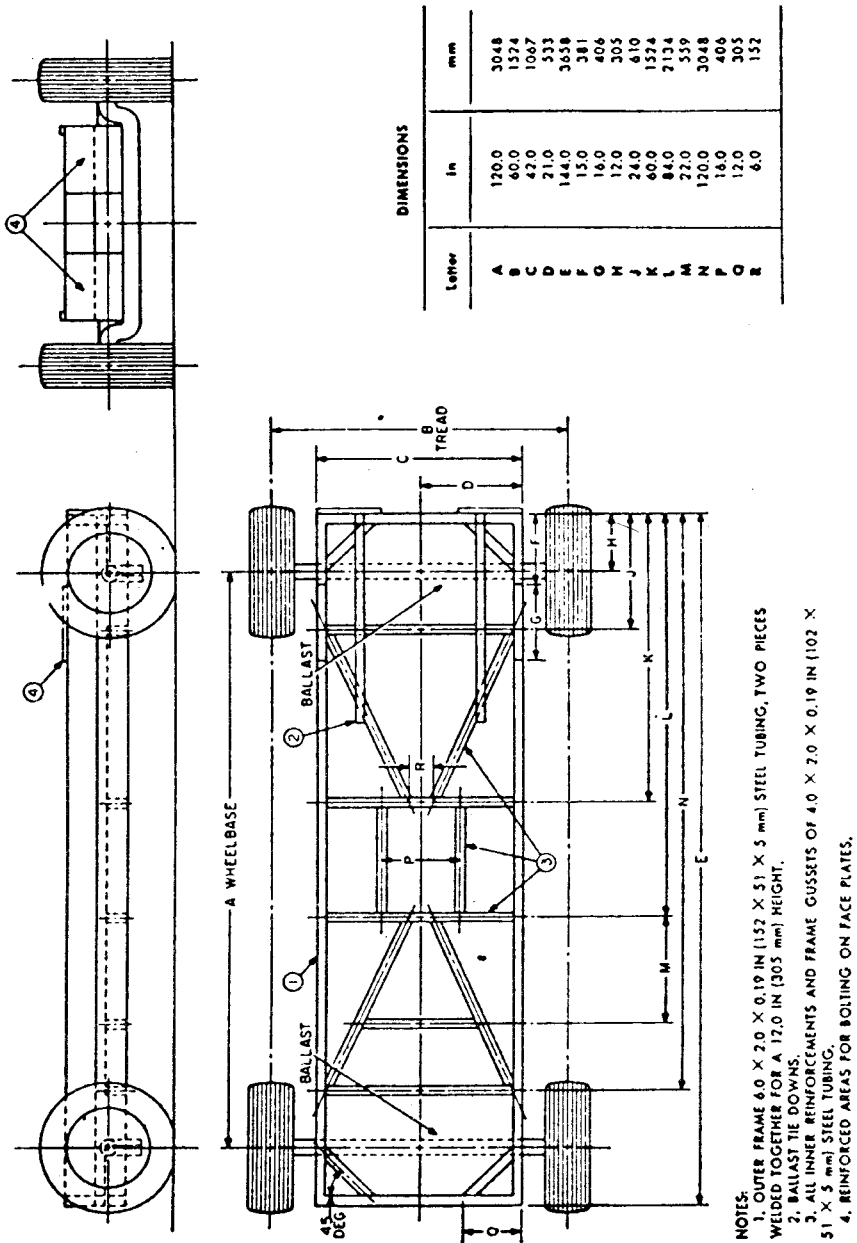


FIG. 1—COMMON CARRIAGE FOR MOVING BARRIERS

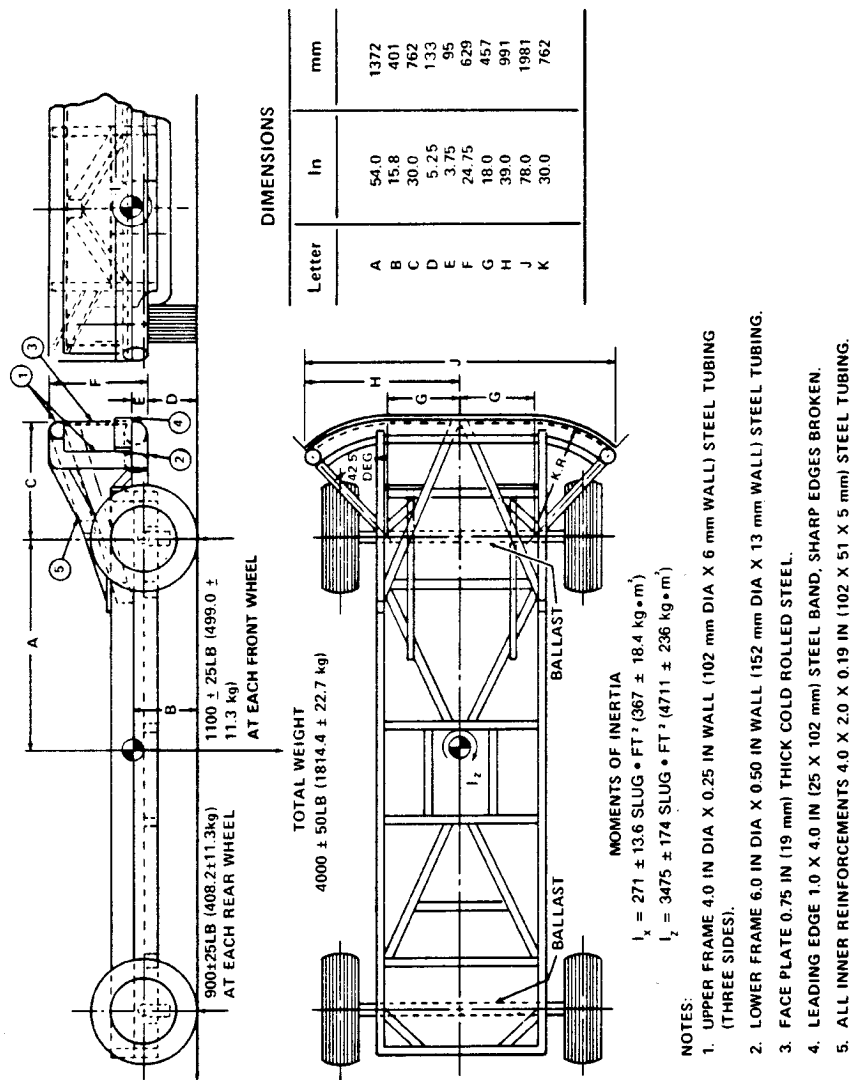


FIG. 2—COMMON CARRIAGE WITH CONTOURED IMPACT SURFACE ATTACHED

[40 FR 48353, Oct. 15, 1975, Redesignated and amended at 41 FR 9350, Mar. 4, 1976; 41 FR 36026, 36027, Aug. 26, 1976; 53 FR 8204, Mar. 14, 1988; 53 FR 49990, Dec. 13, 1988; 58 FR 5638, Jan. 22, 1993; 61 FR 19202, May 1, 1996; 63 FR 28953, May 27, 1998]

EFFECTIVE DATE NOTE: At 63 FR 28953, May 27, 1998, § 571.301 was amended by revising S3, S5.5, S5.6, S6, S6.1, S6.2, S6.3, S6.5, S6.6, S7.1.6, S7.3, S7.5.1, S7.5.2, S7.5.4, and S7.5.5, effective May 27, 1999. For the convenience of the user, the superseded text follows:

§ 571.301 Standard No. 301; Fuel system integrity.

* * * * *

S3. *Application.* This standard applies to passenger cars, and to multipurpose passenger vehicles, trucks and buses that have a GVWR of 10,000 pounds or less and use fuel with a boiling point above 32° F, and to school buses that have a GVWR greater than 10,000 pounds and use fuel with a boiling point above 32° F.

* * * * *

S5.5 *Fuel Spillage: Barrier Crash.* Fuel spillage for each vehicle in any fixed or moving barrier crash test shall not exceed 1 ounce by weight from impact until motion of the vehicle has ceased, and shall not exceed a total of 5 ounces by weight in the 5-minute period following cessation of motion. For the subsequent 25-minute period, fuel spillage during any 1-minute interval shall not exceed 1 ounce by weight.

S5.6 *Fuel spillage: Rollover.* Fuel spillage in any rollover test, from the onset of rotational motion, shall not exceed a total of 5 ounces by weight for the first 5 minutes of testing at each successive 90° increment. For the remaining testing period, at each increment of 90° fuel spillage during any 1-minute interval shall not exceed 1 ounce by weight.

* * * * *

S6. *Test requirements.* Each vehicle with a GVWR of 10,000 pounds or less shall be capable of meeting the requirements of any applicable barrier crash test followed by a static rollover, without alteration of the vehicle during the test sequence. A particular vehicle need not meet further requirements after having been subjected to a single barrier crash test and a static rollover test.

S6.1 *Frontal barrier crash.* When the vehicle traveling longitudinally forward at any speed up to and including 30 mph impacts a fixed collision barrier that is perpendicular to the line of travel of the vehicle, or at any angle up to 30° in either direction from the perpendicular to the line of travel of the vehicle, with 50th-percentile test dummies as specified in part 572 of this chapter at each front outboard designated seating position and at any other position whose protection system is required to be tested by a dummy under the provisions of Standard No. 208,

under the applicable conditions of S7., fuel spillage shall not exceed the limits of S5.5.

S6.2 *Rear moving barrier crash.* When the vehicle is impacted from the rear by a barrier moving at 30 mph, with test dummies as specified in part 572 of this chapter at each front outboard designated seating position, under the applicable conditions of S7., fuel spillage shall not exceed the limits of S5.5.

S6.3 *Lateral moving barrier crash.* When the vehicle is impacted laterally on either side by a barrier moving at 20 mph with 50th-percentile test dummies as specified in part 572 of this chapter at positions required for testing to Standard No. 208, under the applicable conditions of S7., fuel spillage shall not exceed the limits of S5.5.

* * * * *

S6.5 *Moving contoured barrier crash.* When the moving contoured barrier assembly traveling longitudinally forward at any speed up to and including 30 mph impacts the test vehicle (schoolbus with a GVWR exceeding 10,000 pounds) at any point and angle, under the applicable conditions of S7.1 and S7.5, fuel spillage shall not exceed the limits of S5.5.

S6.6 *Anti-siphoning test for alcohol fuel vehicles.* Each vehicle shall have means that prevent any hose made of vinyl plastic or rubber, with a length of not less than 120 centimeters (cm) (47.2 inches) and an outside diameter of not less than 5.2 millimeters (mm) (0.20 inches), from contacting the level surface of the liquid fuel in the vehicle's fuel tank or fuel system, when the hose is inserted into the filler neck attached to the fuel tank with the fuel tank filled to any level from 90 to 95 percent of capacity.

* * * * *

S7.1.6 The vehicle, including test devices and instrumentation, is loaded as follows:

(a) Except as specified in S7.1.1, a passenger car is loaded to its unloaded vehicle weight plus its rated cargo and luggage capacity weight, secured in the luggage area, plus the necessary test dummies as specified in S6., restrained only by means that are installed in the vehicle for protection at its seating position.

(b) Except as specified in S7.1.1, a multipurpose passenger vehicle, truck, or bus with a GVWR of 10,000 pounds or less is loaded to its unloaded vehicle weight, plus the necessary test dummies, as specified in S6., plus 300 pounds or its rated cargo and luggage capacity weight, whichever is less, secured to the vehicle and distributed so that the weight on each axle as measured at the tire-ground interface is in proportion to its GAWR. If the weight on any axle, when the vehicle is loaded to unloaded vehicle weight